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ABSTRACT

Several factors affecting school ground maintenance, including accessibility, site size, topography, exposure, and soil conditions, are discussed. Consideration is also given to site planning, maintenance materials, lawn development, and selection of maintenance equipment. (FS)

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MINIMUM MAINTENANCE PLANNING FOR SCHOOL GROUNDS

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Just a few weeks ago, I had the pleasure to be on a similar platform before a press conference of the nation's top editors in New York City. My subject was very similar to today's, it was "Minimum Maintenance Landscaping and The American Home."

We talked about time savings through proper design, materials and techniques. But, when you are talking to the homeowner about time saving, it

means merely giving him extra time for some other form of leisure. But, when we talk to you gentlemen about maintenance efficiency on the school grounds, we know we are talking in terms not only of time savings but dollars and cents.

But, let's apply our problem for reducing maintenance to the school grounds. Remember now that the school site today is a lot more sophisticated from the school grounds with its cinder yard of our era.

Today, this is a much more complex site with parking lots, bus loading areas, athletic fields, roads, walks, and even outdoor classrooms. Where the children leave off at school's end, the adults of the community take over at night.

This modern-day school has taken new roles and responsibilities and its activities are no longer confined to the school building, but stretch to every corner of the school property. The site has taken on an importance that rivals the school structure itself. After all, the square footage of outdoor classrooms and activity areas is far under the costs inside the school building.

As the character of the school site has changed, so has school site planning. It no longer means putting a building on a piece of land. It means taking into consideration every function of the grounds and integrating them all into one overall smooth working facility that will also be economical to maintain.

Minimum Maintenance and Site Selection

There are many factors in site selection affecting eventual maintenance. These are: accessibility, size, topography, exposure and soil conditions.

1. *Accessibility*
   Select a site easily accessible by car, bus and foot to avoid maintenance of an extravagant on-site road and walk system.
2. *Size of Site*
   Select a site with ample space for future expansion to avoid duplication of site and duplication of maintenance. Additional land areas can remain undeveloped, requiring no maintenance.
3. *Topography*
   Select a site with reasonable grades for easier grounds maintenance.
4. *Exposure*
   Avoid highly exposed sites where high winds can compound snow removal because of heavy drifting and can present difficulty in growing plants and grass.
   Avoid low-pocketed area as poor drainage also will make grass and plants difficult to grow and maintain.
5. *Soil Conditions*
   Select site with soil that will promote growth of healthy turf without excessive watering, special feeding and conditioning.

Minimum Maintenance and Site Planning

Once the site has been selected, the landscape architect is ready to start the job of general site planning. The elements he will work with are the

building location, the roads, walks and play areas, parking lot, bus loading areas, service areas, lawns, plantings and the site's natural features.

One common failing in school site construction is that the planners have failed to consider *all* elements which make up a total school program with the resulting greater maintenance costs and less efficiency.

1. *The School Building*

A "good marriage" between the building and its surrounding terrain is important and should result in gentle, easy-to-maintain slopes that will also provide good drainage away from the structure.

2. *Entrance Roads*

Provide safer, more efficient maintenance by planning roads wide enough for heavy equipment, such as snowplows, which should be able to turn around without backing up. Avoid steep grades (over 10 per cent) which require constant winter salting and sanding and additional surface maintenance the following spring.

3. *Service Areas*

Should be wide enough for safe, easy maneuvering of service and maintenance vehicles, and should provide adequate storage for refuse containers to reduce the maintenance problem of cleanup.

4. *Parking Areas*

Should be designed for peak loads and for easy movement of mainte-

Maintenance and Operations program. L. to r.: standing at the microphone is Guest Speaker Walter F. Bruning, Landscape Architect; Chairman Norman Hutton, Ontario; Panel Members Walter M. Bagwell, Ohio; W. S. Brizendine, Texas; Vice Chairman John T. Lucas, Ohio. Topic: "Minimum Maintenance for School Grounds."

nance vehicles for sweeping and snowplowing. Provide ample area for snow storage.

5. *Play Areas*

Provide adequate areas for each age group to prevent excessive wear and maintenance on adjacent lawn areas.

6. *Pedestrian Walks*

Provide amply wide walks to prevent students from trampling the adjacent grass and tromping out their own footprints. Avoid steps, if possible, not only as a safety hazard, but as an obstacle for maintenance equipment. If steps are used, they should not be steep, and a ramp should be alongside to facilitate moving equipment from one level to another.

7. *Bus Loading Areas*

Should be spacious enough to prevent waiting students from spilling over into adjacent grass areas or plant beds. Wide turning areas will prevent possible damage to walks, curbs and adjacent grounds.

These are the chief elements in a general site plan which can be organized into an easy-to-maintain, efficient school grounds.

Minimum Maintenance Materials For The School Site

So far, our discussion has centered on minimum maintenance as it is planned into the school site. Now, let's zero in on the surface materials required for school grounds and their relation to maintenance. These surface materials include: paving, walks, walls, steps, handrails, fences, lighting, play area, and athletic fields. Planted materials will be treated in a section by themselves.

1. *Paving Materials*

Recommended for Minimum Maintenance:

The most maintenance-free materials for school surface paving are *bituminous asphalt* (blacktop) and *concrete*.

Minimum Maintenance Application:

For minimum upkeep, should be applied on a well-constructed base. Life of both materials can be prolonged by use of sealers to provide protection from weather or salt deterioration.

Never install blacktop on grade of over 10 per cent (one foot slope in 10 feet) as it is impossible to get proper compaction which will result in "washboard effect" and frequent resurfacing.

2. *Curbing Materials*

Used for control of traffic, drainage, and run-off. Also for protection of building, grounds features and road edges.

Recommended for Minimum Maintenance:

Granite is most indestructible material. Requires no maintenance or replacement.

Minimum Maintenance Application:

Can be picked up and moved at any time for road widening, etc.

Other Materials:

Other materials used with some degree of success are *concrete* and *blacktop* which are more subject to weathering and snowplow damage.

3. *Sidewalk Materials*

Recommended for Minimum Maintenance:

Concrete is most acceptable with blacktop (bituminous asphalt) the next choice.

Minimum Maintenance Application:

In snow regions, a silicone coating should be used on concrete to protect against salt deterioration.

Blacktop is easier to install and its flexibility makes it less subject to temperature changes. It requires a well-constructed base and should be bound by a metal edge.

4. *Retaining Walls*

Used to reduce steep grades.

Recommended for Minimum Maintenance:

Poured concrete wall with stone or brick veneer should require next to no care because it combines sturdiness of concrete with the durability of a brick or stone surface.

Minimum Maintenance Application:

Drains or "weeps" should be provided through wall to prevent buildup of water pressure and subsequent buckling.

Other Materials:

Plain concrete wall is next alternate, but will be subject to surface deterioration. Concrete block, if tastefully installed, can also provide a neat, tailored appearance with little maintenance.

Dry Walls (stone walls without mortar) and *cribbed walls* are not recommended for minimum maintenance.

5. *Exterior Steps*

Should be eliminated where possible, but if required, they should be less steep than indoor steps and more carefully constructed.

Recommended for Minimum Maintenance:

Stone is unanimous choice. Has a better non-skid surface and can withstand damage from elements and winter salt.

6. *Handrails*

Should be required alongside all exterior steps, but can be a major maintenance problem requiring frequent care and painting.

Recommended for Minimum Maintenance:

Best material is anodized aluminum which requires no painting and unlike regular aluminum resists corrosion.

7. *Fence Materials*

Recommended for Minimum Maintenance:

Aluminum chain link fencing requires no painting or other maintenance.

Other Materials:

Steel link fence requires frequent painting. Protective coatings add to their practicability, but this can wear off, requiring eventual painting.

8. *Exterior Lighting Materials*

Fixtures should be considered that require no painting or time consuming light replacement.

Recommended for Minimum Maintenance:

Aluminum fixtures are now used so extensively that their initial cost is competing favorably with *steel* poles. But, unlike steel, they require no painting.

9. *Play Area Materials*

Informal Play Areas

Recommended for Minimum Maintenance:

The best materials would be the new *resilient composition materials* with *blacktop* a second choice.

Minimum Maintenance Application:

Because of the expense of the composition materials, an effective compromise is *blacktop* over most of the area, with the *composition materials* used at point of concentrated activity (under play apparatus).

Other Materials:

Although *stone* and *turf* are in common use for play areas, both present major maintenance problems.

Formal Play Areas

Recommended for Minimum Maintenance:

While the *resilient compounds* are best, an excellent less expensive second choice is *blacktop.*

Minimum Maintenance Application:

New colored sealers for blacktop not only protect the surface, but also reduce the heat absorption qualities, provide better visibility and are more pleasing to the eye.

The Maintenance and Operations Meeting audience, listening to the speaker, and waiting to ask questions in order to solve their own problems of grounds maintenance.

10. *Athletic Field Materials*

Recommended for Minimum Maintenance:

Nothing can be used here except a good stand of healthy, well-drained turf with adequate watering facilities.

Minimum Maintenance Application:

Practice field should also be provided to give main fields an occasional rest and time for proper maintenance and reconditioning.

11. *Running Track Materials*

Recommended for Minimum Maintenance:

Resilient composition materials recommended here in the fact of unavailability of cinders. Composition materials will eliminate weed growth characteristic of cinder tracks – a major maintenance problem.

Minimum Maintenance Application:

Composition material should be installed with metal curbing serving not only to confine the material but to meet rigid dimension requirements and prevent grass and weed encroachment.

Developing School Lawn For Minimum Maintenance

The first requirements for a good looking, rugged, easy-to-maintain turf are excellent soil and a top grade seed or sod.

Soil Preparation

1. Provide adequate drainage.
2. Apply at least four inches of topsoil (deeper in play and athletic fields).
3. Provide healthy soil by adding needed ingredients determined by soil analysis.
4. Improve soil texture by adding peat moss or other inorganic matter.
5. Thoroughly cultivate area and fine grade in preparation for seeding.

Grass Selection for Minimum Maintenance

1. Keep to one or two basic grasses.
2. Select grass suitable to your climate.
3. Choose grass with the following maintenance characteristics in mind:
   a. Should be insect-resistant.
   b. Can withstand disease.
   c. Is drought-resistant.
   d. Can take heavy traffic.
4. The use of sod or "instant grass" is heavily recommended for quickly establishing healthy turf. Its advantages:
   a. Provides finished lawn ready for use.
   b. Prevents washouts common to seeding.
   c. Requires less topsoil and preparation.
   d. Can be purchased practically weed-free.

Minimum Maintenance Lawn Program

1. Develop a *sustained program of fertilizing* and feeding.
2. Use *weed and insect controls.*
3. Do not try to grow grass where it won't. (Heavily shaded areas, heavily traveled areas, on steep slopes or under roof overhangs.)

4. Develop a systematic watering program. Include automatic watering system, if possible. Provide convenient water outlets to turf areas. Water at appropriate times.
5. *Recondition lawns at regular intervals* – fall and spring. Control excessive compaction in heavily traveled lawn areas by frequent spiking, aerating and general renovating. Use lawn renovators to remove thatch and permit air, water and fertilizers to easily reach grass roots. Top dress lawn areas yearly, where needed. This helps to maintain level surface and prevents compaction.
6. *Use proper mowing techniques.*
   a. Set mower at higher cut in the hot summer months.
   b. Use alternating mowing patterns to eliminate grain effect.
   c. Keep mower sharp to eliminate discoloration of lawn and injury to grass.
   d. Use land plan method for cutting large areas with big equipment.
7. *Use proper equipment* (discussed in section to follow).

Plant Materials

Simplicity is the keynote in all school plantings. An enormous variety of plants does not necessarily enhance appearance, and will cause untold maintenance. A simple planting scheme can be tastefully designed and still be effectively maintained by relatively inexperienced maintenance personnel.

Factors for Minimum Maintenance Plantings

1. Select plans on the basis of maintenance required.
2. Use hearty species requiring little care.
3. Space plants to allow room for their ultimate size.
4. Obtain healthy nursery stock from a reputable nurseryman. Healthy plans require less care, will not need replacing.
5. Provide best possible soil for planting to insure healthy plant.
6. Avoid trees producing litter – fruits, nuts, seed pods and large flowers. These present an overall eyesore, nuts can become a mowing nuisance and overripe fruit can produce a really messy situation.
7. Avoid plants prone to insect damage or disease.
8. Avoid plants that require constant pruning, trimming or shaping.

Selection of Proper Maintenance Equipment

Grounds maintenance equipment can be segregated into two categories: *grass cutting* and *lawn grooming*. The latter category includes equipment for trimming, edging, sweeping and general grounds cleanup.

Grass cutting equipment comes in a variety of sizes ranging from 18-inch power mowers to the huge tractor types that can tow as many as 11 gangs for a 25-foot swath, and also come with a vast assortment of accessories for other maintenance chores. The equipment should be suited to the job it is supposed to do, and the size of the site. Hand-pushed power mowers are ideal for smaller confined grass areas, while the larger equipment should be considered for the larger, unbroken expanses of lawn.

Larger, self-contained up-front mowing machines make possible a quick,

quality cut of large areas because they leave a smooth surface with no wheel marks. Because the cutting units are out in front of the operator, they also mean greater operating safety on school grounds.

Multi-purpose equipment should be considered such as tractors which can tow an assortment of attachments in addition to mowing. Year-round maintenance also should be a factor in selection of equipment which will not only mow grass in summer, but can spread fertilizer in spring, clean up the grounds in fall, and clear snow in winter.

Time Studies

Time studies (by Jacobsen) have revealed some interesting comparisons of time savings with power equipment over hand tools. Also, some comparisons between different types of power tools to show how proper use of power equipment and manpower can save man-hours and reduce maintenance budgets.

For instance, some of these time studies showed that grass raking is ten times faster with a power sweeper. That one snow thrower is worth 20 men with snow shovels. And that trimming with power is 20 times faster than by hand.

But, closer to your interest is a time study showing how the use of one large capacity machine can be much more economical than the use of several smaller units. The test areas were three park sites of a large Midwest city. The comparison studies were made of a five-gang front-mowing unit and of three tractors towing three gang mowers.

The findings were very conclusive. The five-gang machine completed the job in 12½ hours, while the smaller units took 21½ man-hours. The bigger machine took almost one-half the time and yet its initial cost was only one-half that of the other three units. Add to this the fact that three smaller units would take more than twice the amount of maintenance as the bigger, single unit, and you can see the economy of selecting the larger machine.

Smaller equipment – mowers, trimming equipment, etc. – has its place in the maintenance program, but for large school sites, economy in maintenance is achieved with large equipment rather than with numerous smaller pieces which take more people, more time to do the same job, and require more maintenance, more gas, more oil and more storage area.

At the same time, we are recommending "large enough" equipment, we want to caution against becoming "over-powered." In other words, don't send your biggest piece out to cut a small, confined area which would be like hammering a nail with a pile driver. A well-balanced maintenance department will have equipment to efficiently handle the various maintenance requirements posed by its grounds.

The moral here is for school administrators and maintenance people to keep abreast of the equipment available and properly fit it to the job. Multi-site use of equipment also should be considered. Most of the large lawn maintenance vehicles today have highway transport gears so they can swiftly move from one site to another.

Many schools report that increasing mechanization of their maintenance

function has permitted them to take on the care of bigger and more complex grounds without the necessity of adding personnel.

Minimum Maintenance Design For School Grounds

1. Provide for continuous mowing by avoiding sharp corners and angles on grounds and in plant beds.
2. Develop mowing strips against walls, buildings, under fencing, etc., to eliminate hand trimming.
3. Keep grass surfaces flush with paved areas such as walks, roads, playgrounds, parking lots, to prevent unnecessary trimming and provide easier movement of maintenance vehicles.
4. Avoid hand trimming around trees by use of grass barrier or metal edging. Will also eliminate damage from mower.
5. Use flush paving around lawn obstructions. This can eliminate trimming and thereby speed up mowing in relatively large areas with obstructions such as utility vent pipes, hydrants, etc.
6. Avoid impossible-to-mow situations. Use low maintenance ground covers on steep slopes, bumpy areas and otherwise hard-to-mow terrain.
7. Locate water outlets conveniently. Handling of excessive lengths of hose should not be required to water lawn and plant beds. The absolute minimum in maintenance would be an automatic sprinkler system.
8. Provide free movement of maintenance equipment from one area to another and from one level to another. All roads, walks, ramps and entrances should be planned wide enough to easily accommodate equipment.
9. Avoid trying to grow grass in heavily shaded areas, heavily traveled areas, or under roof overhangs.
10. Keep lawn areas clear of unnecessary obstructions. Where possible, keep shrubs, plant beds and other obstructions out of lawn areas in order to achieve continuous mowing pattern.

Conclusion

From all of this, I am sure that you can see that grounds maintenance no longer is sending a man out with a mower. It has become more complex along with the increasing size and function of the school site. Because of this increased size and importance of the site, maintenance should be a prime consideration from the very beginning—site selection—and continue through every step of planning. Reducing maintenance time and costs should be a major factor not only in selection of equipment, but in the proper utilization of manpower in operating that equipment. And, in turn, the grounds should be laid out for powered maintenance which wrings the utmost efficiency from these machines.